Claims

1. A method for forming a ferroelectric capacitor device comprising the steps of:

forming a substrate extending in a first plane and comprising a number of layers of material;

forming a hard mask layer on said substrate;

forming a first layer of a first material on said hard mask layer;

defining a hard mask shape by etching said hard mask layer;

depositing a second layer of said first material on said etched hard mask layer, said deposited second layer having one or more side surfaces extending substantially perpendicular to said plane of said substrate;

etching said second layer and said number of layers forming said substrate to shape said ferroelectric capacitor device.

2. A method according to claim 1, wherein the step of forming said first layer of said first material on said hard mask layer comprises forming said first layer of a material which has a slow etch rate compared to said hard mask layer material.

3. A method according to claim 1, wherein the step of forming a first layer of a first material on said hard mask layer comprises forming said first layer of aluminium oxide (Al_2O_3).

4. A method according to claim 1, wherein the step of forming a first layer of a first material on said hard mask layer comprises forming said first layer of titanium.

5. A method according to claim 1, wherein the step of forming a first layer of a first material on said hard mask layer comprises forming said first layer of titanium dioxide (TiO_2).

6. A method according to claim 1, wherein the step of forming a first layer of a first material on said hard mask layer comprises forming said first layer of silicon rich oxide (SRO).

7. A method according to claim 1, wherein the step of forming a hard mask layer on said substrate comprises forming said hard mask layer of TEOS.

8. A method according to claim 1, wherein the step of forming said substrate comprises forming one or more of said number of layers of iridium.

9. A method according to claim 1, wherein the step of forming said substrate comprises forming one or more of said number of layers of PZT.

10. A method according to claim 1, wherein the step of defining the hard mask shape by etching said hard mask layer comprises applying a photolithographic layer to said first layer of first material, exposing said photolithographic layer; and developing said exposed photolithographic layer to produce an etch pattern for said first layer of first material and said hard mask layer.

11. A method according to claim 1, wherein the step of etching said second layer and said number of layers forming said substrate to shape said ferroelectric capacitor device comprises applying an RIE process.

12. A method according to claim 1, further comprising forming a second layer of hard mask material on said first layer of said first material prior to the step of defining said hard mask shape.

13. A method according to claim 12, wherein the step of defining said hard mask shape comprises etching said second layer of hard mask material to provide an etch pattern for said first layer of hard mask material.

14. A ferroelectric capacitor device formed according to the method of claim 1.

15. An FeRAM device formed according to the method of claim 1.

16. A device comprising:

a substrate extending in a first plane and comprising a number of layers of material;

a first layer of hard mask material formed on said substrate;

a first layer of a first material formed on said first layer of hard mask material, said first layer of hard mask material being etched to define said hard mask; and

a second layer of said first material deposited on said etched layer of hard mask material, said deposited second layer having one or more side surfaces extending substantially perpendicular to said plane of said substrate.

17. A device according to claim 16, wherein said first layer of said first material comprises a material which has a slow etch rate compared to said hard mask layer material.

18. A device according to claim 16, wherein said first layer of said first material comprises aluminium oxide (Al_2O_3).

19. A device according to claim 16, wherein said first layer of said first material comprises titanium.

20. A device according to claim 16, wherein said first layer of said first material comprises titanium dioxide (TiO_2).

21. A device according to claim 16, wherein said first layer of said first material comprises silicon rich oxide (SRO).

22. A device according to claim 16, wherein said a hard mask material comprises TEOS.

23. A device according to claim 16, wherein one or more of said number of layers of said substrate comprise iridium.

24. A device according to claim 16, wherein one or more of said number of layers of said substrate comprise PZT.

25. A device according to claim 16, wherein said first layer of hard mask material is etched by applying a photolithographic layer to said first layer of first material, exposing said photolithographic layer; and developing said exposed photolithographic layer to produce an etch pattern for said first layer of first material and said hard mask layer.

26. A device according to claim 16, further comprising a second layer of hard mask material formed on said first layer of said first material.

27. A device according to claim 26, wherein said second layer of hard mask material is etched to provide an etch pattern for said first layer of said first material and said first hard mask material.

28. A ferroelectric capacitor device comprising one or more devices according to claim 16.

29. An FeRAM device comprising one or more devices according to claim 16.